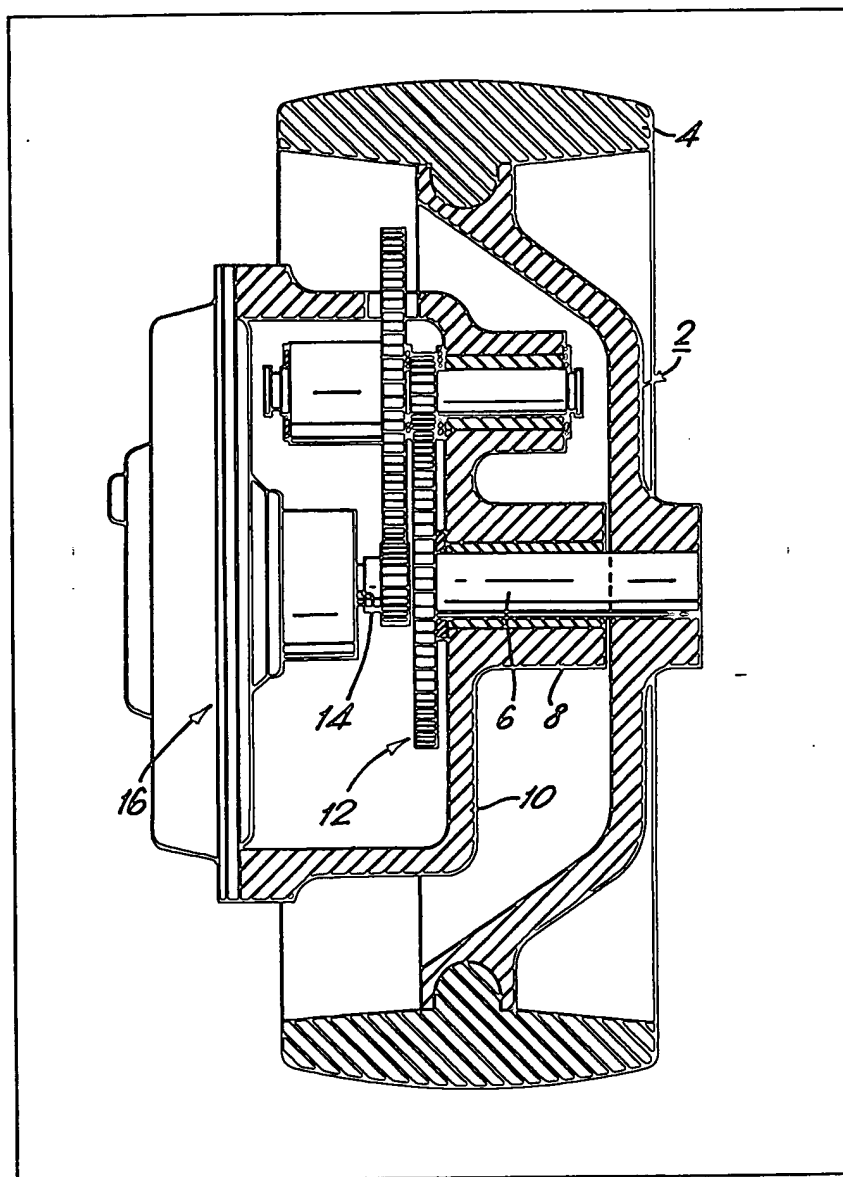


- (21) Application No 8210502
(22) Date of filing 8 Apr 1982
(43) Application published
1 Feb 1984
(51) INT CL³
B60K 7/00
(52) Domestic classification
B7H C16G2 P6A P7D1 V1A
V1D V4X
(56) Documents cited
GB 1481558
GB 1414134
GB 1135202
GB 1058438
GB 0241633
(58) Field of search
B7H
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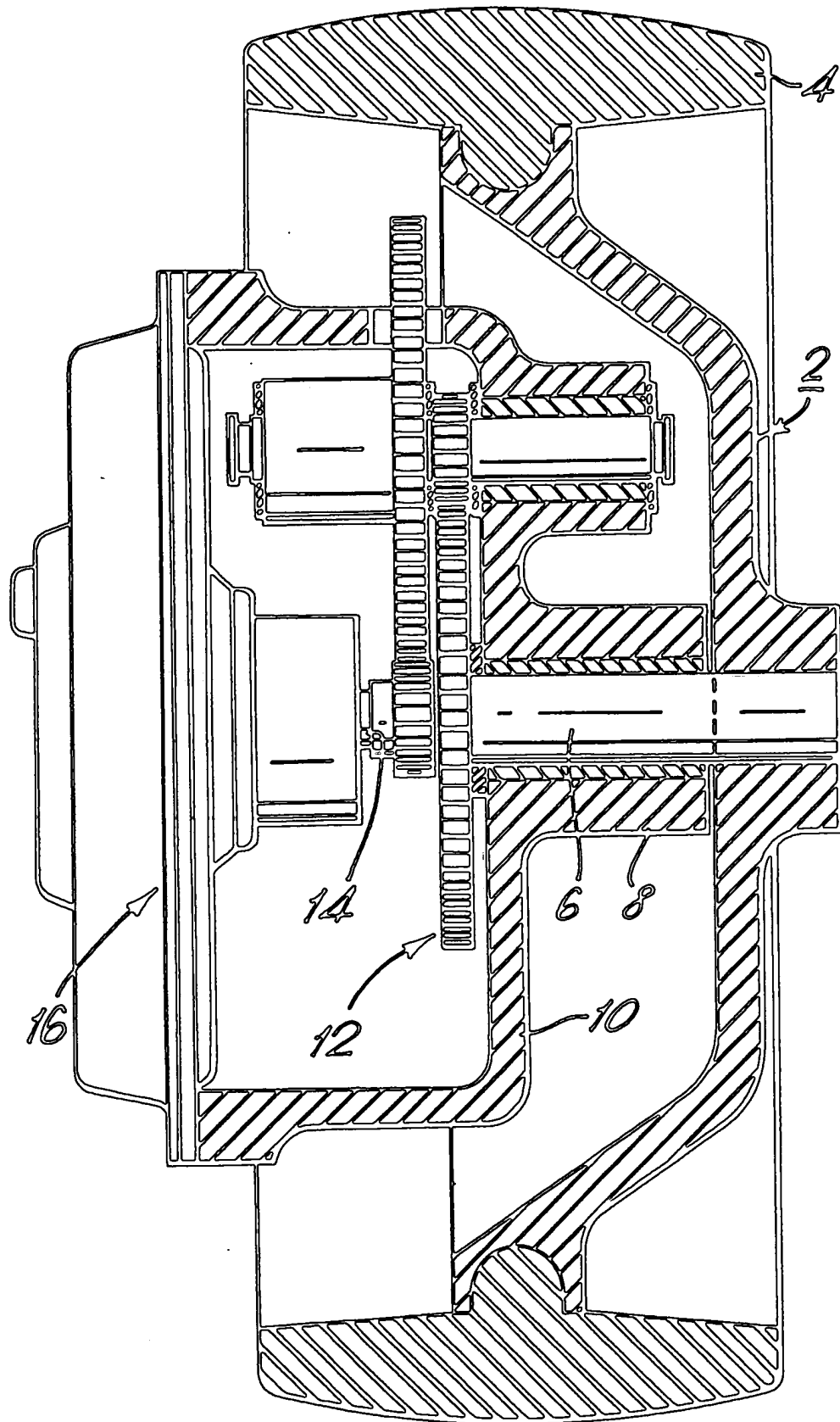
(54) A self-propelling hub unit

(57) The self-propelling hub unit has a frame member (10) providing a casing for reduction gearing (12). An electric

pancake type motor (16) is supported by the casing (10) and its drive shaft (14) is coupled by way of the reduction gearing (12) to a substantially U-shaped (in cross-section) hub member (2) which is also supported by the casing (10). A tyre (4) may be provided on the hub member (2). The hub unit may be used to provide motive power to a variety of vehicles and devices, e.g. a wheelchair, golf trolley, or hospital trolley.



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SPECIFICATION

A self propelling hub unit

- 5 The present invention relates to a self-propelling hub unit and to a self-propelling wheel formed from such a hub unit.

According to the present invention there is provided a self-propelling hub unit comprising a frame member, an electric motor supported by said frame member, the motor having a drive shaft, a hub member supported by the frame member and coupled to the drive shaft for rotation relative to the frame member.

- 15 The hub unit may be used to provide motive power to a variety of vehicles and devices. As it incorporates an electric motor it is quiet and pollution free and is therefore particularly useful for providing motive power to hospital trolleys, wheel-chairs, golf trolleys and the like.

Conventional wheels have an axle and the mounting of the wheel to a vehicle or other device has to be axial. The hub unit of the invention does not have a conventional axle and it can be used in any disposition. Accordingly, there are no constraints on the mounting required to connect the hub unit to a vehicle or device.

- Preferably the electric motor is a DC motor so that it can be powered by a battery. If required, the battery can be supported by the frame member such that the hub unit is completely self-contained and self-propelling. In a preferred embodiment, the DC electric motor is a type having a flat armature such as a pancake type motor. As a pancake type motor is compact the hub unit can similarly be made compact.

The hub member may be directly connected to the drive shaft of the electric motor. However, it is preferred that the drive shaft be coupled to the hub member by gear means, for example, by reduction gearing. In a preferred embodiment, the gear casing of the gear means forms the frame member.

- The hub member preferably has a substantially U-shaped cross-section such that at least a portion of the frame member is enclosed within the hub member. This provides a particularly compact construction.

The invention also extends to a self-propelling wheel comprising a hub unit as defined above, the hub member having a substantially cylindrical periphery, and a tyre carried on the periphery of the hub member.

- An embodiment of the present invention will hereinafter be described, by way of example, with reference to the accompanying drawing in which the single Figure shows a cross-section of a self-propelling wheel.

The wheel illustrated has a hub member 2 having a substantially U-shaped cross-section. The substantially cylindrical periphery of the hub member 2 carries a tyre 4. At its centre the hub member 2 has an axially extending shaft 6. In the embodiment illustrated the shaft 6 is fixed to a substantially circular portion of the hub member but if required the shaft 6 may be integrally formed with the rest of

the hub member.

- The shaft 6 is rotationally supported in a bushing 8 defined in a casing 10. This casing houses a reduction gearing 12 which couples the shaft 6 to the drive shaft 14 of an electric motor 16. The electric motor 16 is fixed to and supported by the casing 10 which forms a supporting frame member for the complete unit.

The electric motor 16 is a DC motor of the pancake type. It will therefore be appreciated that the whole unit is compact. For example, in one embodiment, the complete wheel has a radius of the order of 12 cm and a total axial dimension of the order of 14.5 cm.

- As the electric motor is a DC motor it can be powered by a battery (not shown). This battery may be remote from the unit and connected thereto by a lead or it may be supported by the casing 10.

It will be appreciated that when power is supplied to the motor 16 the hub member 2 is rotated about its axis and relative to the casing 10. It will also be appreciated that the hub member will rotate whatever the disposition of the unit.

- The unit, with or without the tyre may be mounted by suitable means to a vehicle or device to provide motive power. The mounting may be attached to any non-rotating part of the unit and need not extend axially of the hub member 2. Thus, the mounting may be fixed to the casing 10 and/or to the housing of the motor 16. As the unit imposes few constraints on the structure and disposition of the mounting, this can be arranged in accordance with the design of the vehicle or device to which motive power is to be supplied by the unit. Electrical control means (not shown) are provided on the device or vehicle to control the operation of the unit.

If required, a toothed or other drive belt may be carried on the periphery of the hub member in place of a tyre to provide drive to a vehicle or other device.

- In one embodiment, the electric motor is reversible such that the hub member 2 can be driven in either direction of rotation. If required, the hub member 2 may be driven in one direction and allowed to free wheel in the other direction of rotation. Such a free wheeling facility can be provided, for example, by including an overrunning clutch in the means coupling the shaft 6 of the hub member 2 to the drive shaft 14 of the motor 16.

Obviously, the unit may be used to supply motive power to many different vehicles or devices. For example, the unit may be used for driving hospital trolleys, golf trolleys, wheelchairs and the like.

CLAIMS

1. A self-propelling hub unit comprising a frame member, an electric motor supported by said frame member, the motor having a drive shaft, a hub member supported by the frame member and coupled to the drive shaft for rotation relative to the frame member.
2. A hub unit as claimed in Claim 1, wherein the electric motor is a DC motor.
3. A hub unit as claimed in Claim 2, further comprising a battery supported by said frame mem-

ber and connected to supply the DC motor.

4. A hub unit as claimed in any preceding claim, wherein the electric motor has a flat armature.

5. A hub unit as claimed in any preceding claim wherein the drive shaft is coupled to the hub member by gear means, and said gear means are housed in a gear casing formed by said frame member.

6. A hub unit as claimed in any preceding claim, wherein the hub member is a substantially circular member fixed to an axially extending driven shaft which is rotationally mounted in said frame member and coupled to said drive shaft.

7. A hub unit as claimed in any preceding claim, wherein the drive shaft is coupled to the hub member by clutch means enabling the hub member to be driven in one direction of rotation and to free wheel in the other direction of rotation.

8. A hub unit as claimed in any preceding claim, wherein the hub member has a substantially U-shaped cross-section and wherein at least a portion of the frame member is enclosed within the hub member.

9. A self-propelling hub unit substantially as hereinbefore described with reference to and as illustrated in the accompanying drawing.

10. A self-propelling wheel comprising a hub unit as claimed in any preceding claim in which the hub member has a substantially cylindrical periphery, and a tyre carried on the periphery of the hub member.